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(54) DISPENSING PUMP FOR FUEL VENDING SYSTEMS

SPENDERPUMPE FÜR KRAFTSTOFFVERKAUFSSYSTEME

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Description

[0001] The present invention relates to a dispensing pump for fuel vending systems.

[0002] As is known, fuel vending systems are typically provided with one or more dispensing units, which allow users to refuel their vehicles with a specific type of fuel, such as gasoline, diesel fuel, methane gas or LPG.

[0003] Each dispensing unit is commonly constituted by a dispensing assembly which comprises a fuel containment tank and a dispensing line, which draws from the tank by means of a dispensing pump and is connected in output to a dispensing nozzle for introducing the fuel in the tank of the vehicles.

[0004] Auxiliary devices for controlling the correct operation of the dispensing line, such as for example a filter and a device for measuring the flow rate or the amount of fuel dispensed, are usually arranged along the dispensing line. Dispensing pumps with such filters are disclosed for example in documents WO 2007/036754 A1, EP 0 701 062 A1 or EP 2 241 533 A1.

[0005] The dispensing assemblies of the dispensing units that are present in vending systems are susceptible of improvements.

[0006] In particular, the need is felt to render the dispensing assemblies constructively less complex, simpler to manage, dimensionally more compact and more convenient to maintain.

[0007] The aim of the present invention is to provide a dispensing pump for fuel vending systems that is capable of improving the background art in one or more of the aspects indicated above.

[0008] Within this aim, an object of the invention is to provide a dispensing pump for fuel vending systems that offers the possibility to simplify and render more compact the dispensing units of fuel vending systems.

[0009] Another object of the invention is to provide a dispensing pump for fuel vending systems that allows easy maintenance of the dispensing units of fuel vending systems.

[0010] A further object of the present invention is to provide a dispensing pump for fuel vending systems that is particularly compact and easy to apply.

[0011] Another object of the present invention is to provide a dispensing pump for fuel vending systems that is constructively simple to provide.

[0012] Another object of the invention is to provide a dispensing pump for fuel vending systems that offers the greatest assurances of reliability and safety in operation.

[0013] A further object of the present invention is to overcome the drawbacks of the background art in a manner that is alternative to any existing solutions.

[0014] Not least object of the invention is to provide a dispensing pump for fuel vending systems that can be manufactured at low cost, so as to be competitive also from a purely economic standpoint.

[0015] This aim, as well as these and other objects which will become better apparent hereinafter, are

achieved by a dispensing pump for fuel vending systems according to claim 1, optionally provided with one or more of the characteristics of the dependent claims.

[0016] Further characteristics and advantages of the invention will become better apparent from the description of a preferred but not exclusive embodiment of the dispensing pump for fuel vending systems according to the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a sectional side view of the dispensing pump for fuel vending systems according to the invention.

[0017] With reference to the figure, the dispensing pump for fuel vending systems according to the invention, designated generally by the reference numeral 1, comprises a pump body 2, which forms internally a pumping chamber 3, inside which an impeller 4 is rotatably accommodated and is functionally connected to motor means 5.

[0018] The pump body 2 furthermore has an intake connector 6 and a delivery connector 7, which communicate with the pumping chamber 3 and can be connected to a liquid fuel dispensing line.

[0019] For example, the intake connector 6 can be connected to a body 8 for coupling to a liquid fuel tank, while the delivery connector 7 can be connected to a duct which leads into a dispensing nozzle.

[0020] The pump body 2 has at least one coupling portion 9 for at least one auxiliary device of the dispensing line to which the pump is connected.

[0021] In particular, the coupling portion 9 can advantageously comprise at least one accommodation seat 10 for at least one liter counter 11.

[0022] Preferably, the accommodation seat 10 is formed substantially between the intake connector 6 and the pumping chamber 3 and more preferably is formed substantially coaxially to the intake connector 6.

[0023] For example, the liter counter 11 can be constituted by a turbine which is mounted so that it can rotate along the axis of the accommodation seat 10 and cooperates with a sensor element 12 which is fixed to the outer wall of the intake connector 6.

[0024] The coupling portion 9 comprises at least one coupling region 13 for at least one filter 14.

[0025] The coupling region 13 is formed along at least one delivery duct 15, which in turn is formed in the pump body 2 and is extended from the pumping chamber 3 toward the delivery connector 7.

[0026] Conveniently, the filter 14 is provided by a filtration cartridge, which has a substantially cylindrical external enclosure 16 which is closed at one end and can be coupled, at the other end, to the coupling region 13 by interlocking, screw coupling or in other ways.

[0027] In greater detail, the external enclosure 16 forms internally a filtration chamber 17, which accommodates axially a filtering body 18 which is internally hollow and provided with a substantially cylindrical filtration wall 19, through which the liquid to be filtered, which arrives from the filtration chamber 17, flows and which delimits

internally a filtered liquid collection chamber 20.

[0028] Advantageously, the delivery duct 15 comprises a first portion 15a which is extended from the pumping chamber 3 and leads into a distribution portion 15b, which communicates with the filtration chamber 17 of the filter 14 by means of access ports 21, for the entry of the fluid fuel into the filtration cartridge of the filter 14.

[0029] In particular, the access ports 21 are arranged between the filtering body 18 and the side wall of the external enclosure 16 and are formed conveniently in a cap 22 for closing the end of the external enclosure 16 of the filter 14 which is coupled to the coupling region 13 and is interposed between the distribution portion 15b and the inside of the cartridge of the filter 14.

[0030] The delivery duct 15 furthermore has a second portion 15c which communicates with the filtered liquid collection chamber 20 through a communication opening 23 formed centrally in the cap 22, and with the delivery connector 7, for example by means of a third portion 15d, and which is arranged axially to the distribution portion 15b, so that the distribution portion 15b and the second portion 15c are arranged substantially coaxially to each other.

[0031] Conveniently, the connection between the pumping chamber 3 and the delivery duct 15 is provided by an output opening 28, which in particular connects the pumping chamber 3 to the first portion of the delivery duct 15.

[0032] Advantageously, the pump body 2 is provided in at least two parts which are mutually assembled, respectively at least one first part 2a, which comprises a main body 24, which forms internally at least the pumping chamber 3 and the intake connector 6, and at least one second part 2b, which comprises at least one head 26, which forms the delivery duct 15 and is provided with the delivery connector 7.

[0033] Conveniently, between the main body 24 and the head 26 there is an interposed cover 27 for closing the pumping chamber 3, in which the output opening 28 is formed which connects the pumping chamber 3 to the first portion 15a of the delivery duct 15.

[0034] Advantageously, the axis of the output opening 28 is oriented substantially at right angles to the axis of the delivery connector 7.

[0035] It should be noted that the intake connector 6 and the delivery connector 7 are arranged with their axes substantially parallel to each other and laterally spaced.

[0036] More particularly, the third portion 15d of the delivery duct 15 is aligned with the delivery connector 7 and is parallel and laterally adjacent to the first portion 15a of the delivery duct 15, which in turn is extended substantially parallel to the axis of the intake connector 6 and of the delivery connector 7.

[0037] The first portion 15a and the third portion 15d of the delivery duct 15 are consequently perpendicular to the axis of the output opening 28 of the pumping chamber 3, while the second portion 15c of the delivery duct 15 is oriented substantially parallel to the axis of the out-

put opening 28 and substantially at right angles to the axis of the third portion 15d of the delivery duct 15.

[0038] Conveniently, a containment body 30 is fixed to the main body 24 of the pump body 2, on the opposite side with respect to the head 26, and in practice constitutes a third part 2c of the pump body 2 and is for example connected to the first part 2a of the pump body 2 constituted by the main body 24 by means of tension members 31.

[0039] In particular, the containment body 30 forms at least one part of an accommodation chamber 32 for the motor means 5 which, for the remaining part, is instead formed by the main body 24.

[0040] Advantageously, the motor means 5 comprise an electric motor constituted by a stator 33, which is fixed to the walls of the accommodation chamber 32, and by a rotor 34, which is arranged inside the stator 33 and is mounted around an actuation shaft 35, which is connected to the impeller 4 and rotatably supported by the main body 24 and by the containment body 30.

[0041] At least one accommodation chamber for power supply and control means of the motor means 5 is furthermore formed in the containment body 30.

[0042] More particularly, in the containment body 30 there is conveniently at least one first accommodation chamber 36a which accommodates an electronic circuit board 37 connected to the motor means 5 and to the sensor element 12.

[0043] Conveniently, the first accommodation chamber 36a is closed by a cover 38 on which for example an actuation lever system 39 is mounted which is connected to a switch 40 and can be actuated by the user to control the starting or shutdown of the pump.

[0044] A second containment chamber 36b also is formed in the containment body 30 and accommodates a terminal strip 41 which is connected to the electronic board 37 and to a power supply cable 42, which is connected to an outlet 43 which is provided for example on a closure cover 44 of the second containment chamber 36b.

[0045] The operation of the pump, according to the invention, is as follows.

[0046] By means of the actuation of the actuation lever system 39, the pump is turned on, with consequent rotational actuation of the impeller 4.

[0047] The liquid fuel is then drawn by means of the coupling body 8 and enters the pump through the intake connector 6.

[0048] Before reaching the pumping chamber 3, the flow of the liquid fuel passes through the liter counter 11, so that the flow rate of the liquid fuel can be detected by the electronic board 37.

[0049] Once it has reached the pumping chamber 3, the liquid fuel is sent to the delivery duct 15 through the output opening 28.

[0050] In particular, the flow of the liquid fuel enters the first portion 15a of the delivery duct 15 and reaches the distribution portion 15b, by means of which it is introduced

in the filtration chamber 17 of the filter 14 through the access ports 21.

[0051] At this point the liquid fuel passes through the filtration wall 19 of the filtering body 18, reaching the filtered liquid collection chamber 20, from which it exits through the communication opening 23, so as to enter the second portion 15c and reach the delivery connector 7 via the third portion 15d of the delivery duct 15.

[0052] The above description allows to understand that the invention is capable of achieving the intended aim and objects, since it allows to associate with the pump body the auxiliary devices that are useful for controlling the flow of the liquid fuel that passes through the dispensing line to which the pump according to the invention is connected.

[0053] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims; all the details may furthermore be replaced with other technically equivalent elements.

[0054] In practice, the materials used, as well as the contingent shapes and dimensions, may be any according to the requirements and the state of the art.

[0055] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A dispensing pump for fuel vending systems, comprising a pump body (2) which forms internally a pumping chamber (3), which rotatably accommodates an impeller (4), functionally connected to motor means (5), and provided with an intake connector (6) and a delivery connector (7), which communicate with said pumping chamber (3) and is configured to be connected to a fuel dispensing line, wherein said pump body (2) has at least one coupling portion (9) for at least one auxiliary device of said dispensing line wherein said coupling portion (9) comprises at least one coupling region (13) for at least one filter (14) **characterized in that** said coupling region (13) is formed along at least one delivery duct (15), which is formed in said pump body (2) and extends from said pumping chamber (3) toward said delivery connector (7).
2. The pump according to claim 1, **characterized in that** said coupling portion (9) comprises at least one accommodation seat (10) for at least one liter counter (11).
3. The pump according to claim 2, **characterized in**

that said accommodation seat (10) is formed substantially between said intake connector (6) and said pumping chamber (3).

4. The pump according to one or more of the preceding claims, **characterized in that** said pump body (2) comprises at least two mutually assembled parts (2a, 2b, 2c), respectively at least one first part (2a), which comprises a main body (24), which forms internally at least said pumping chamber (3) and is provided with said intake connector (6), and at least one second part (2b), which comprises at least one head (26) which forms said delivery duct (15) and is provided with said delivery connector (7).
5. The pump according to one or more of the preceding claims, **characterized in that** said filter (14) comprises a filtration cartridge, provided with a substantially cylindrical external enclosure (16), which is closed at one end and can be coupled, at the other end, to said coupling region (13), said external enclosure (16) forming internally a filtration chamber (17) which accommodates axially a filtering body (18), which is internally hollow and provided with a substantially cylindrical filtration wall (19) which delimits a filtered liquid collection chamber (20).
6. The pump according to claim 5, **characterized in that** said delivery duct (15) comprises a first portion (15a) which extends from said pumping chamber (3) and leads into a distribution portion (15b), which communicates with said filtration chamber (17) by means of access ports (21) arranged between said filtering body (18) and the side wall of said external enclosure (16), and a second portion (15b), which communicates with said filtered liquid collection chamber (20) and with said delivery connector (7) and is arranged axially to said distribution portion (15b).
7. The pump according to one or more of the preceding claims, **characterized in that** said pumping chamber (3) communicates with said delivery duct (15) via an output opening (28), the axis of said output opening (28) being oriented substantially at right angles to the axis of said delivery connector (7).
8. The pump according to one or more of the preceding claims, **characterized in that** a cover (27) for closing said pumping chamber which forms said output opening (28) is interposed between said main body (24) and said head (26).
9. The pump according to one or more of the preceding claims, **characterized in that** it comprises, on an opposite side with respect to said head (26), a containment body (30), which is fixed to said main body (24) and forms at least one portion of an accommo-

dation chamber (32) for said motor means (5) and at least one accommodation chamber (36a, 36b) for power supply and control means of said motor means (5).

Patentansprüche

1. Eine Spenderpumpe für Kraftstoffverkaufssysteme, die einen Pumpenkörper (2) umfasst, welcher in seinem Inneren eine Pumpenkammer (3) bildet, die ein Flügelrad (4) drehbar aufnimmt, funktionell mit Motormitteln (5) verbunden, und ausgestattet mit einem Einlassanschluss (6) und einem Auslassanschluss (7), die mit der Pumpenkammer (3) kommunizieren, und ausgebildet ist, um an eine Kraftstoffabgabeleitung angeschlossen zu werden; wobei der Pumpenkörper (2) mindestens ein Kopplungsteil (9) für mindestens eine Zusatzvorrichtung der Abgabeleitung hat, wobei das Kopplungsteil (9) mindestens einen Kopplungsbereich (13) für mindestens einen Filter (14) umfasst; **dadurch gekennzeichnet, dass** der Kopplungsbereich (13) entlang mindestens einer Abgabeleitung (15) geformt ist, welche in dem Pumpenkörper (2) geformt ist und sich von der Pumpenkammer (3) zu dem Auslassanschluss (7) erstreckt.
2. Die Pumpe gemäß Anspruch 1, **dadurch gekennzeichnet, dass** das Kopplungsteil (9) mindestens einen Aufnahmesitz (10) für mindestens einen Literzähler (11) umfasst.
3. Die Pumpe gemäß Anspruch 2, **dadurch gekennzeichnet, dass** der Aufnahmesitz (10) im Wesentlichen zwischen dem Einlassanschluss (6) und der Pumpenkammer (3) geformt ist.
4. Die Pumpe gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** der Pumpenkörper (2) mindestens zwei zusammenmontierte Teile (2a, 2b, 2c) umfasst, nämlich mindestens einen ersten Teil (2a), der einen Hauptkörper (24) umfasst, welcher in seinem Inneren mindestens die Pumpenkammer (3) bildet und mit dem Einlassanschluss (6) ausgestattet ist, und mindestens einen zweiten Teil (2b), der mindestens einen Kopf (26) umfasst, welcher die Abgabeleitung (15) bildet und mit dem Auslassanschluss (7) ausgestattet ist.
5. Die Pumpe gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** der Filter (14) eine Filterpatrone umfasst, ausgestattet mit einem im Wesentlichen zylindrischen externen Gehäuse (16), welches an einem Ende geschlossen ist und am anderen Ende mit dem Kopplungsbereich (13) gekoppelt werden kann, wobei das externe Gehäuse (16) in seinem Inneren eine Filterkammer (17) bildet, die axial einen Filterkörper (18) aufnimmt, wel-

cher innen hohl und mit einer im Wesentlichen zylindrischen Filtrationswand (19) versehen ist, die einen Sammelbehälter (20) für filtrierte Flüssigkeit begrenzt.

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6. Die Pumpe gemäß Anspruch 5, **dadurch gekennzeichnet, dass** die Ablassleitung (15) einen ersten Abschnitt (15a) umfasst, der sich von der Pumpenkammer (3) erstreckt und in einen Verteilabschnitt (15b) führt, welcher mit der Filterkammer (17) über Zugangsöffnungen (21) kommuniziert, die zwischen dem Filterkörper (18) und der Seitenwand des externen Gehäuses (16) angeordnet sind, und einen zweiten Abschnitt (15b), der mit dem Sammelbehälter (20) für filtrierte Flüssigkeit und mit dem Auslassanschluss (7) kommuniziert und axial zu dem Verteilabschnitt (15b) angeordnet ist.
7. Die Pumpe gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** die Pumpenkammer (3) mit der Ablassleitung (15) über eine Ausgangsöffnung (28) kommuniziert, wobei die Achse der Ausgangsöffnung (28) im Wesentlichen in rechten Winkeln zur Achse des Auslassanschlusses (7) ausgerichtet ist.
8. Die Pumpe gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** ein Deckel (27) zum Verschließen der Pumpenkammer, der die Ausgangsöffnung (28) bildet, zwischen dem Hauptkörper (24) und dem Kopf (26) angeordnet ist.
9. Die Pumpe gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** sie auf einer dem Kopf (26) gegenüberliegenden Seite einen Aufnahmekörper (30) umfasst, welcher an dem Hauptkörper (24) befestigt ist und mindestens einen Teil einer Aufnahmekammer (32) für die Motormittel (5) und mindestens eine Aufnahmekammer (36a, 36b) für Stromversorgungs- und Steuerungsmittel der Motormittel (5) bildet.

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Revendications

1. Pompe de distribution pour des systèmes de vente de carburant, comprenant un corps de pompe (2) qui forme intérieurement une chambre de pompage (3), qui accueille en rotation un rotor (4), connecté fonctionnellement à des moyens de moteur (5), et pourvu d'un connecteur d'admission (6) et d'un connecteur de distribution (7), qui communiquent avec ladite chambre de pompage (3) et est configuré pour être connecté à une ligne de distribution de carburant, dans laquelle ledit corps de pompe (2) comporte au moins une partie de couplage (9) pour au moins un dispositif auxiliaire de ladite ligne de distribution dans laquelle ladite partie de couplage (9)

- comprend au moins une région de couplage (13) pour au moins un filtre (14) **caractérisée en ce que** ladite région de couplage (13) est formée le long d'au moins un conduit de distribution (15), qui est formé dans ledit corps de pompe (2) et s'étend depuis ladite chambre de pompage (3) vers ledit connecteur de distribution (7). 5
2. Pompe selon la revendication 1, **caractérisée en ce que** ladite partie de couplage (9) comprend au moins un siège (10) pour accueillir au moins un compteur de litres (11). 10
3. Pompe selon la revendication 2, **caractérisée en ce que** ledit siège (10) est formé sensiblement entre ledit connecteur d'admission (6) et ladite chambre de pompage (3). 15
4. Pompe selon une ou plusieurs des revendications précédentes, **caractérisée en ce que** ledit corps de pompe (2) comprend au moins deux parties assemblées mutuellement (2a, 2b, 2c), respectivement au moins une première partie (2a), qui comprend un corps principal (24), qui forme intérieurement au moins ladite chambre de pompage (3) et est pourvue dudit connecteur d'admission (6), et au moins une seconde partie (2b), qui comprend au moins une tête (26) qui forme ledit conduit de distribution (15) et est pourvue dudit connecteur de distribution (7). 20
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5. Pompe selon une ou plusieurs des revendications précédentes, **caractérisée en ce que** ledit filtre (14) comprend une cartouche de filtration, pourvue d'une enceinte extérieure (16) sensiblement cylindrique, qui est fermée à une extrémité et peut être couplée, à l'autre extrémité, à ladite région de couplage (13), ladite enceinte extérieure (16) formant intérieurement une chambre de filtration (17) qui loge axialement un corps de filtration (18), qui est intérieurement creux et pourvu d'une paroi de filtration (19) sensiblement cylindrique qui délimite une chambre de collecte de liquide filtré (20). 35
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6. Pompe selon la revendication 5, **caractérisée en ce que** ledit conduit de distribution (15) comprend une première partie (15a) qui s'étend depuis ladite chambre de pompage (3) et mène dans une partie de distribution (15b), qui communique avec ladite chambre de filtration (17) au moyen d'orifices d'accès (21) agencés entre ledit corps de filtration (18) et la paroi latérale de ladite enceinte extérieure (16), et une seconde partie (15b), qui communique avec ladite chambre de collecte de liquide filtré (20) et avec ledit connecteur de distribution (7) et est agencée axialement à ladite partie de distribution (15b). 45
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7. Pompe selon une ou plusieurs des revendications précédentes, **caractérisée en ce que** ladite chambre de pompage (3) communique avec ledit conduit de distribution (15) via une ouverture de sortie (28), l'axe de ladite ouverture de sortie (28) étant orienté sensiblement à angle droit par rapport à l'axe dudit connecteur de distribution (7).
8. Pompe selon une ou plusieurs des revendications précédentes, **caractérisée en ce qu'un** couvercle (27) pour fermer ladite chambre de pompage qui forme ladite ouverture de sortie (28) est intercalé entre ledit corps principal (24) et ladite tête (26).
9. Pompe selon une ou plusieurs des revendications précédentes, **caractérisée en ce qu'elle** comprend, sur un côté opposé à ladite tête (26), un corps d'isolement (30), qui est fixé sur ledit corps principal (24) et forme au moins une partie d'une chambre d'accueil (32) pour lesdits moyens de moteur (5) et au moins une chambre d'accueil (36a, 36b) pour une alimentation électrique et des moyens de commande desdits moyens de moteur (5).

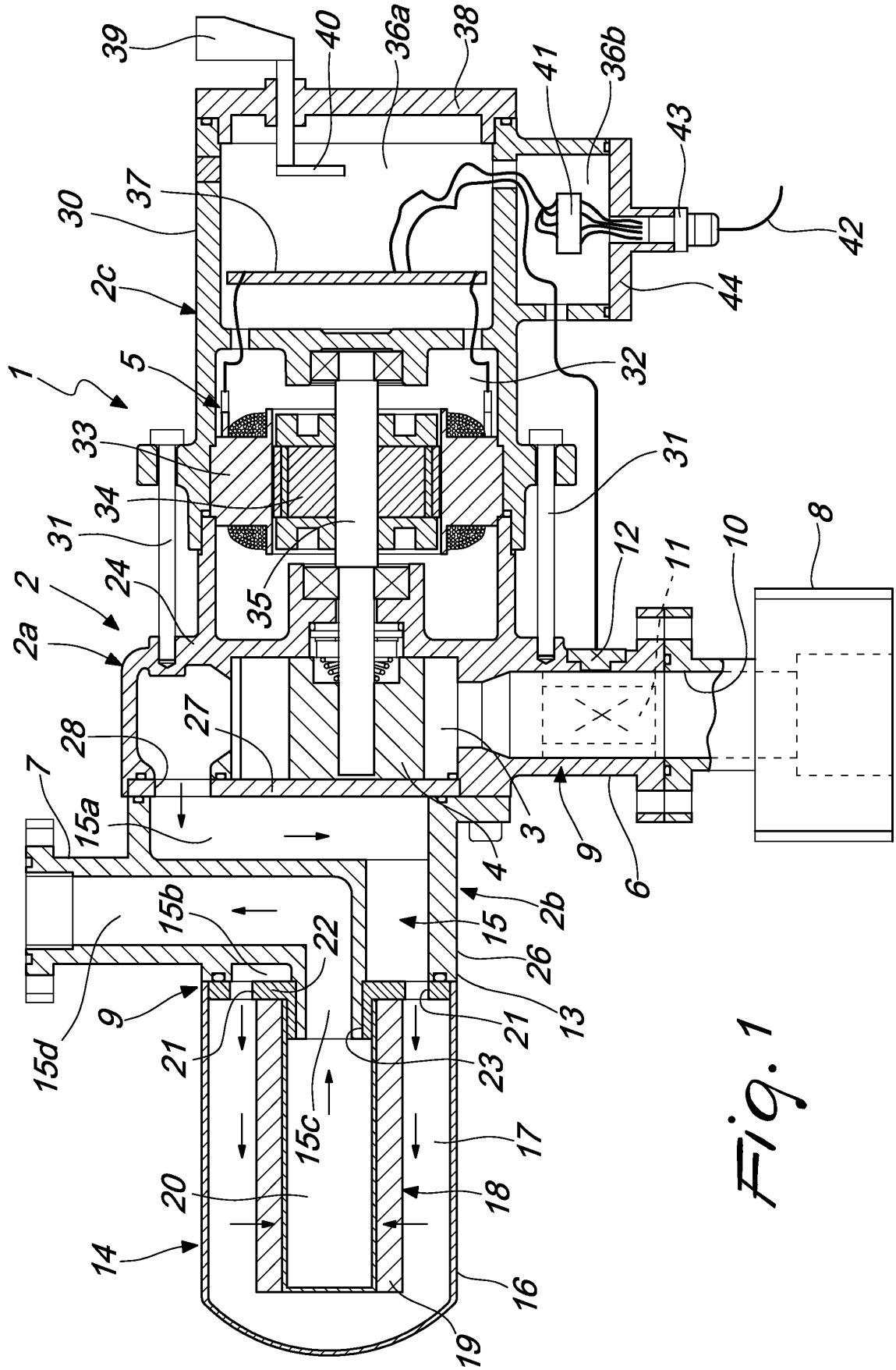


Fig. 1

REFERENCES CITED IN THE DESCRIPTION

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